

1 We claim:

1 1. A method of measurement of topographic features on a surface of a substrate, comprising:

2 a) directing a focused beam of particles to fall at a first angle  $\theta_1$  on to a first portion of the  
3 surface of the substrate, where  $\theta_1$  is defined with respect to an average normal to the  
4 surface of the substrate;

5 b) detecting particles emitted from the first portion of the surface of the substrate at a second  
6 angle  $\theta_2$ , where  $\theta_2$  is defined with respect to the average normal to the surface of the  
7 substrate, the particles detected with a particle detector;

8 c) interposing a particle opaque material between the first portion of the surface of the substrate  
9 and the particle detector, the particle opaque material having an edge;

10 d) determining the relative position of the edge and the first portion of the surface of the  
11 substrate from the results of the detection of particles.

1 2. The method of claim 1, where the particles of the focused beam of particles are charged  
2 particles.

1 3. The method of claim 2, where the charged particles are electrons.

1 4. The method of claim 2, where the charged particles are ions.

1 5. The method of claim 1, where the particle opaque material is separate from the substrate.

- 1        6. The method of claim 5, further comprising:
- 2        e) directing the focused beam of particles on to a plurality of portions of the surface of the
- 3                substrate; then,
- 4        f) determining the topographic features of the plurality of portions of the surface from the results
- 5                of the detection of particles.
- 1        7. The method of claim 6, wherein the topographic features of the plurality of portions form a
- 2                trench in the substrate, and wherein the trench and the edge form an angle significantly
- 3                greater than 0 °.
- 1        8. The method of claim 7, wherein the topographic features of the plurality of portions form a
- 2                trench in the substrate, and wherein the trench and the edge form an angle approximately
- 3                90°.
- 1        9. The method of claim 8, wherein the trench in the substrate has sidewalls which are
- 2                approximately parallel to the average normal to the surface of the substrate.
- 1        10. The method of claim 1, further comprising:
- 2        e) repeating steps a-d with at least one of the angles  $\theta_1$  and  $\theta_2$  changed.
- 1        11. The method of claim 10, further comprising determining the parameters of the focused
- 2                particle beam wherein the focused particle beam is focused on the surface of the
- 3                substrate.
- 1        12. The method of claim 1, wherein the particle opaque material between the first portion of
- 2                the surface of the substrate and the particle detector is a portion of the substrate.

1      13. The method of claim 12, further comprising:  
  
2      e) directing the focused beam of particles on to a plurality of portions of the surface of the  
3      substrate; then,  
  
4      f) determining the topographic features of the plurality of portions of the surface from the results  
5      of the detection of particles.

1      14. The method of claim 13, further comprising:  
  
2      e) repeating steps a-f with a change of the angle  $\theta_1$ .

1      15. The method of claim 13, wherein  
  
2      the plurality of portions of the surface of the substrate are portions of the surface of a trench in  
3      the substrate, and the edge is an edge of the trench.